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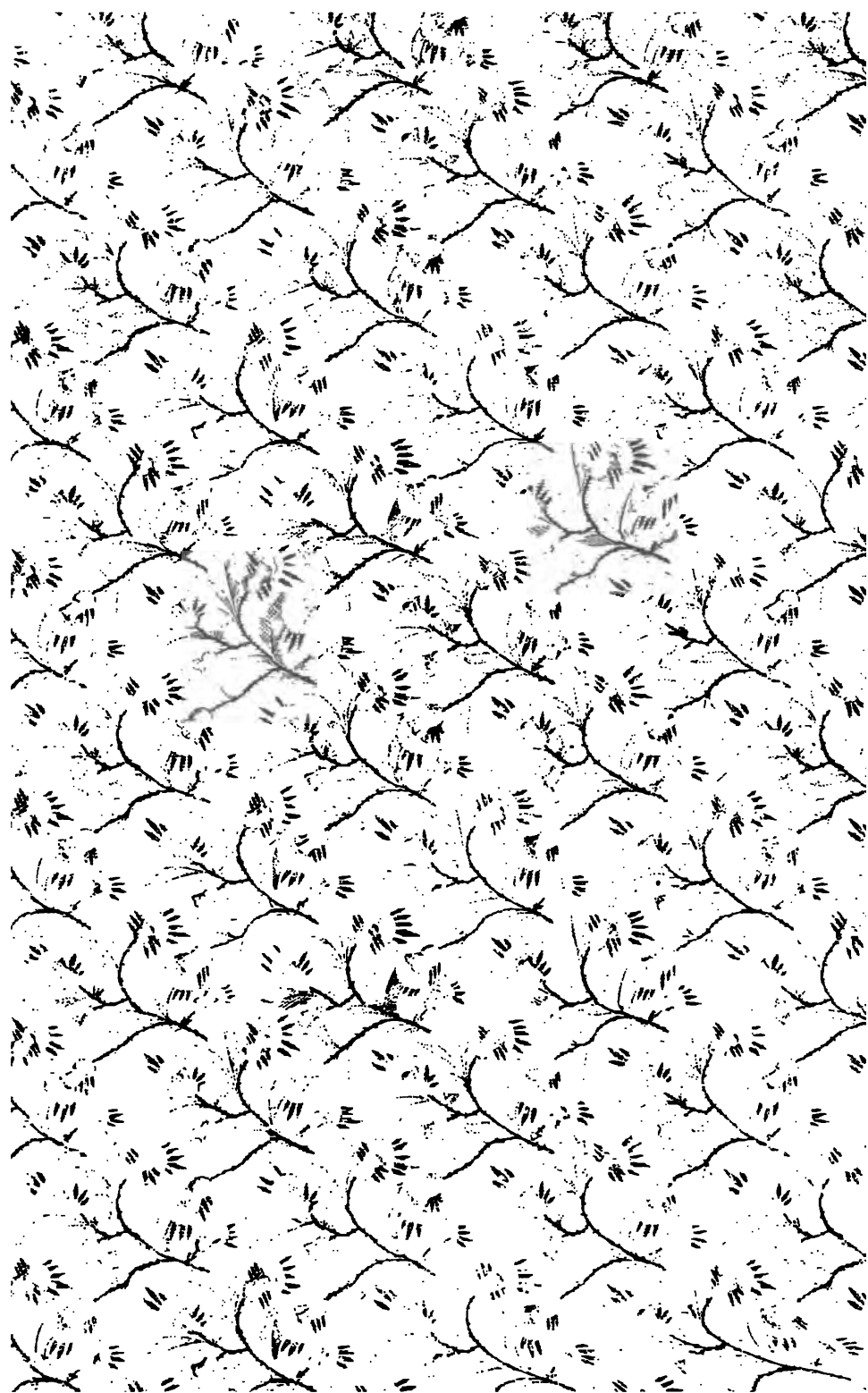
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# Psychology of Manual Training

By WILLIAM T. HARRIS, LL. D.

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## THE PSYCHOLOGY OF MANUAL TRAINING.

*Read before the Department of Superintendence, National Educational Association,  
Washington, D. C., March 7, 1889.*

BY WILLIAM T. HARRIS, LL. D.

IN bringing forward my thoughts on the Psychology of Manual Training, I desire to say in advance that I shall endeavor to assume and maintain a judicial attitude towards this important educational question. I shall avoid the position of advocate or polemic so far as I am able.

As persons interested practically and theoretically in the management of schools we meet from year to year to discuss the vital questions that may arise in our province. Practically and theoretically, it is our fortune and our choice to find ourselves arrayed on different sides of each question. A free comparison of opinions in a friendly spirit gives us each matters for further reflection and may lead to partial revision of opinions previously held. A free comparison of grounds or reasons for opinions is still more profitable. All search for grounds, all search for principles goes back out of the region of surface, and diversity of facts — goes back out of the multiplicity of details, towards unity. From differences we converge towards agreement when we begin to compare the grounds of our opinions. Principles and fundamental grounds are held in common by all minds, and this is necessarily so in case of ultimate principles at least.

Now as a class of people interested in the management of schools we have two opposite trends of opinion before us — we may divide here, one class of us tending towards conservatism, and the other class tending towards new experiments with a view to progress and improvement. One class holds by the heritage of the past and strives to conserve its power. What is established has been established through struggle, and the victory of the strongest. A study of the grounds for the existence of what is, discovers many and powerful reasons for the continuance of the existing order even in presence of the fact that defects are everywhere visible. The conservative sees the defects, but attributes them to inefficient administration and not to essential shortcomings.

On the other hand the party whose watch-word is progress bends its mind on the discovery of what is inadequate in the old system. It marshals the shortcomings and refers them to vicious methods inherent in the old system. It looks about for remedies and undertakes radical changes, bravely confident of their success. And inasmuch as the teaching profession is for the main part engaged during its daily tasks in the work of repression (inhibition), holding back pupils from doing wrong or improper things, teaching self-control and that action of the will which psychologists call inhibitory, it (the teacher's profession,) tends towards the conservative side too readily. It is engaged in struggling against caprice and arbitrariness, against raw, unformed habits and manners, against thoughtless disregard of the interests of others. This effort is apt to swallow up the teacher and cause neglect of that other side of will-training—the side of spontaneous, original activity. It neglects the positive for the negative, because the negative is the first and indispensable, while the positive may appear of itself without any education, after the school period is over, or outside of the school. Mere positive will-power without the negative or inhibitory power will produce only anarchy. The new human being must learn to inhibit or hold back by an effort of will his native mere animal impulses and desires, having due regard to the requirements of social existence—cleanliness of person and clothing, courtesy and decency of manners towards others, purity of life, temperance, prudence, fortitude, and justice, all requiring this inhibition (or self-restraint over impulse), and conformity to pre-ordained ideals of order. Mere spontaneous originality attacks all these things and runs riot.

On the other hand, mere prescription, mere inhibitory will-power developed to extremes produces only a mechanical civilization—a dead mechanical state of social existence. We look upon the Chinese education as productive of such a condition. All is cut and dried and given to the pupil as a ready-made form into which he must fit himself by inhibition of natural caprice and inclination. The consequence is the least possible progress and the completest administration of the old system.

What the philosophy of history must regard as the ideal standard of progress among nations is therefore not a mere perfection in administration, for this is achieved in the perfectly stationary empire of conservatism.



The ideal standard of progress is found in the form of government which secures the greatest degree of individual development while not losing the centralized power of the whole. In the patriarchal empire the social whole is perfect at the expense of individual freedom. We Americans are apt to think that the German empire sacrifices to some extent the development of the individual for the sake of the perfection of the administration of the will of the social whole. Certain it is that the German statesman looks upon our American regime as sacrificing the welfare of the social whole in order to give an unreasonable margin for individual whims and preferences.

The Anglo-Saxon doctrine (expressed in French words) — *laissez faire* — is thought to go too far when it permits parents to choose illiteracy for their children, or when it permits an illiterate community to substitute lynch law for the regular judicial process.

However this may be regarded there is certainly a mutual relation between the form of government, with its administrative process, and the self-activity of the individual; and that government is best which secures the greatest perfection of central administration through the greatest development of individual freedom. But it remains true that the self-activity of the individual must be strictly limited by the necessity of perfect central administration for the good of the whole.

May we not in like manner name our criterion of Educational Progress as the approach towards a system that secures the greatest individual self-activity of the pupil while it builds up in his character perfect obedience to law, divine and human, and a sacred regard for truth.

While our progressive wing of superintendents do not always move forward in a straight line, for not all change is progress, yet on the line of cautious experiment there is most advance to be hoped for. I think that the friends of progress will admit that out of one hundred changes not more than one real gain results. Yet without experiment there might be no progress at all.

In the present question, that of Manual Training, we have eminently able men in our body taking strong grounds in its advocacy and initiating bold experiments in the direction of adopting it into the system of elementary instruction. On the other hand we have men who look upon the movement as unnecessary for various reasons, or else await the results, thinking that

it is safe to adopt the new system after it has been proved a success. Experiments are so costly that one must be cautious in undertaking them. Ninety-nine fail and one succeeds. Meanwhile debate and discussion will aid us in interpreting the results of experiment as they appear. It is safe even for conservative-minded men to approach the subject theoretically.

The Psychology of Manual Training is concerned chiefly with the mental effect of such training and a comparison of its results with those of other branches of the course of study pursued in school. What is called the "educational value" of such training in the use of tools is a matter for psychology. Social necessity, the necessity for useful labor to provide a subsistence, this is not a psychological matter in its primary aspect, but only in its secondary, or indirect relation to mind — the effect of a consciousness of possessing the ability of independent self-support in elevating the tone of character, or the effect of shortening the era of childhood and hastening the day in which the child assumes the responsibility of self-support. Whatever the ground for introducing a branch into the course of study, there is evidently a direct or indirect psychological question involved.

M. Sluys, of Belgium, tells us that in Sweden, "In the beginning the economic conception was generally adopted, and everywhere manual training was looked upon as a means of preparing the children of the common people to earn their living. But gradually it came to be recognized that manual training has a more elevated purpose and one indeed more useful in the deeper meaning of the term. It came to be considered as an educative process, for the complete moral, physical, and intellectual development of the child." He affirms that in Sweden the combination of manual training and the teaching of purely theoretical subjects "ensures the integral cultivation of all the faculties and all the aptitudes which make up the complete man."

The expression which we often hear used by the advocates of manual training — "put the whole boy to school," states in a plain, forcible way the meaning of the phrase "integral cultivation of all the faculties and all the aptitudes which make up the complete man."

It has been fashionable in educational treatises since the days of Pestalozzi to define the province of education as "the full and harmonious development of all our faculties." This is, however,



a survival of Rousseauism, and like all survivals from that source, is very dangerous. It is of first importance to consider this definition in the light of psychology.

At first glance we see that it makes no discrimination among the faculties themselves; all have a right, each has a right to cultivation, and the only limitation of this cultivation is found in the word "harmony." What the harmony should be is not said. It is implied, however, that the harmony once reached, there would be a perfect human being. Harmony implies a sort of balance, and that there is no faculty of the soul which may be developed supremely — no faculty like that of Divine Charity for example, which should be supreme.

Again, this definition ignores the great distinction between our higher and lower faculties, between our faculties that are means to ends above them and those faculties which are ends in themselves. Sound psychology for example looks upon ethical insight as higher than insight into what is useful as a means to an end. The adaptation of means to ends — the use of physical strength, industry, eating and drinking, any sort of bodily training is subordinate to the question of the end for which it is used — moral purpose being esteemed higher. Moral faculty is supreme as regards all such things and is not a coördinate factor.

Æsthetic faculty, taste for the beautiful, is not regarded as coördinate with moral faculty by any people since the Greeks or before the Greeks. Gracefulness was the supreme end of life and esteemed to be even higher than morality in Hellenic art. It was in the Greek thought that this notion of harmony arose as a symbol of perfection. For in Greek art alone the physical and psychical are in perfect balance. Not so in Christian art, — and far otherwise in the Christian religion. For Christianity teaches that food, drink, raiment — or creature comforts of all sorts — yea, life itself is infinitely beneath consideration when weighed against the spiritual service of humanity. Bodily health and vigor, sound digestion, good sleep, keen sense-perception, are all good if rightly used, or subordinated to higher faculties; but to speak of them as forming a harmony with the higher is placing the soul and body on the same plane, and this is a fundamental error in educational psychology.

In the third place the definition ignores the distinction between man as an individual and man as social whole, the state, the civil

community, the church, the family. It fancies man the individual to be something complete in himself and without relation to society — just as we can speak of a clock or any piece of mechanism as complete when all its parts are present and properly adjusted. Man has two selves; one his natural self as puny individual, and another his higher self embodied in institutions. This is the worst defect in the definition, because it leads the thought of the educator away from the essential idea of education, which is this: Education is the preparation of the individual for reciprocal union with society — the preparation of the individual so that he can help his fellow men and in turn receive and appropriate their help.

The "harmony" definition is abstract, this definition is concrete. An abstract definition is liable to misinterpretation, the concrete one is not. Reciprocal help of social whole and individual in the first place implies both special and general education. To help one's fellows one must get skill in some useful occupation. This may be in any realm of human labor, physical or intellectual. But to be able to receive the help of one's fellow men implies general education, the capacity to receive and appropriate the help of institutions — the spiritual help of the race — in science, art, literature, and moral and religious ideas, as well as in the matter of creature comfort. The world market yields to the individual man for his day's labor a share in the productions of the world; necessary food, clothing, and shelter, luxuries, amusements, churches, libraries, lectures, newspapers, and books. The prudent man buys wisdom and develops his lower faculties only to the extent that they are means to this higher end of acquiring wisdom and dispensing it to others.

This criticism of the definition of education which looks toward a harmonious development of all our faculties does not rule out manual training from education, but the contrary. Manual training fits very many for some useful occupation which they may fill as their special vocation. Neither does it prove that manual training is not of a general educative character. That is something to be investigated.

The Slöjd instruction, according to Dr. Otto Salomon, the director of the famous Manual Training Normal School at Nääs, in Sweden, secures the following educational results: —

1. Skill in the use of tools; 2. Love of labor — industry and persistence; 3. Self-reliance; 4. Exactness; 5. Attentiveness;



6. Sharpens the eye and sense of form; 7. Good bodily training.

In another connection he gives its educational results as, —

1. Acquisition of general dexterity of the hand; 2. Instilling taste for work, and respect for rough, honest, bodily labor; 3. Training in habits of order, neatness, exactness, cleanliness; 4. Accustoming to attention, industry, and perseverance; 5. Promoting the development of the physical powers; 6. Training the eye and sense of form.

There is no disputing the assertion that the Slöjd is educative when we consider that all work and all play of every kind are educative in one way or another.

When the domestic work (Hus-slöjd), which formerly flourished in the households of Sweden — it consisted in the making of knick-knacks chiefly out of wood — when this failed because of the introduction of more elegant machine-made goods, far more tasteful and elegant in form, at a very low price, the peasant could not afford to compete, and household work tended towards neglect and disuse. It is said that more attention was given to farming as a consequence, but farming could not occupy all the time in the season of long nights and short days. Hence the rise of an association to restore the Slöjd or domestic manufacture of knick-knacks, in 1846. In 1872, the government began to encourage education in this branch of labor. At first, wood carving was urged; but only to provoke resistance. But later it has been decided that variety of work is essential, and at the Slöjd normal school at Nääs, the various tools of the carpenter are taught, and also those of the wood turner, and the blacksmith, besides wood carving; the making and mending of simple articles is practised; even wheels and carts are constructed, but mostly such articles as wooden spoons, boxes, boot-jacks, mallets, and netting shuttles. The number of schools in which this work is taught had increased to seven hundred in 1884, from eighty-seven at the time of our Centennial.

When we admit that the use of tools in the manufacture of articles of wood or iron is educative, we do not say much for it. All games of boys — like marbles, quoits, base-ball, Jack-straws — are educative, especially in the matters (*a*) of development of physical powers; (*b*) the acquisition and dexterity of hand and accuracy of eye; (*c*) in perseverance; (*d*) in attention.

A game of whist cultivates circumspection, careful attention,



the calculation of probabilities, and such matters. The first beginnings of these things in children are of great interest educationally. The scientific observations of Professor Preyer have taught us how important is the epoch when the human infant ceases to clutch objects only with the four fingers like most of the ape family, and learns to use his thumb over against his two fingers. This contra-position of the thumb began in the case he records about the twelfth week of the infant's life — at first a sort of reflex action without the will, and then soon after produced by the will so that contraposition of the thumb was quite attained by the fourteenth week. The infant rejoices in each new power gained, and incessantly practises it with voluntary attention until it by degrees sinks into a habit.

The first look of attention on the part of the child of Doctor Preyer was given to some swinging tassels on the thirty-ninth day. On the ninth week it noticed and gave attention to the ticking of a watch.

Other important epochs are the following: 1. Holding up its head by the act of will in the eleventh week. 2. Standing alone in the forty-eighth week. 3. Walking in the fiftieth week. 4. Recognition of its mother on the sixty-first day. 5. Recognition of its own image in a mirror in the sixth month — stretching out its hand to the image — also recognizing its father's image and turning to look at the real father and compare him with the image. 6. In the seventeenth week is noticed the first recognition of self, indicated by attention to his own hand; and six weeks later an elaborate series of experiments of touching himself and foreign objects alternately. 7. The discovery of itself as cause when it can produce sound by rattling a paper, or by striking one object with another, or tearing asunder a piece of paper — this is a most delightful discovery to the child. 8. But imitation, which begins about the fifteenth week and by-and-by develops into the use of language, is the most interesting evidence of the growth of the intellect.

This glance at infant life reminds us that in education things that are very trivial at one epoch are of exceeding importance at another. In cases of arrested development the educational value of such matters as the contraposition of the thumb — the exertion of the will in supporting the body erect, and in imitation, is coming to be well understood, as one may see in recent

schools for the feeble-minded. But the order of development of these things is all important. An act is educative when first learned, and then only. After it has become habit it is a second nature—a new nature produced by the will, and is no longer educative. Man as a bundle of habits is a self-made being.

Professor Preyer's child was so delighted with the discovery that it could put a cover on a box, that it deliberately took it off and replaced it seventy-nine times without an interval of rest. It was an educative step in its development—a step in the discovery of its selfhood as an energy, as well as a step in the discovery of adaptation in the external world.

Many educational devices have been proposed for schools, which merely repeat lessons that the child has already made for itself in infancy. The so-called object lessons of school are quite frequently of this character. So lessons on the properties of objects—the qualities of wood, stone, metals, etc., are not of much use in school because such things are provided for in the child's self-education. I do not of course refer to the scientific study of such things, which classifies and exhausts those qualities, and gives the history and geography of the object—science is a different matter. The cultivation of the powers of observation in our schools—this too, is very often the farce of repeating lessons which have been learned by the child before he could talk.

Now all the lessons of infancy involve such training in dexterity of the hand, accuracy of the eye, the sense of form, industry, perseverance, the gaining of the power of careful attention, and the development of the body—such training as is claimed for the Slöjd education. Moreover, the lessons of cleanliness, and neatness, and industry are taught by the good mother quite early to her child. The child learns to use knife and fork and spoon very early. By-and-by he learns to use the jack-knife, and we all know the self-education that goes on in the use of this tool among Anglo-Saxon boys.

But what of all this? one inquires. Although it is educative, it is not properly school education. How does such infant education differ from reading, writing, arithmetic, geography, history, yes, even from grammar? Here is the vital point of our discussion.

Man elevates himself above the brute creation by his ability to withdraw his attention from the external world of the senses and



give attention to energies, forces, producing causes, principles. He can look from the particular to the general, without losing the particular he grasps together the whole realm of the particular in the general—or in more significant language—in mastering the cause of anything he grasps together and comprehends an indefinite series of effects. He is not obliged to hold the details, that is to say, memorize all the facts and hold their details in a storehouse. He can see them all in a principle—he can see in a cause its possible consequences. Understanding the meteoric process he can readily explain any step in it—clouds, rain, snow, evaporation, fog, et cetera. Without this knowledge of the general which always rests on some insight into causal process real or supposed, man would be bound down to the present fact before his senses. But with this knowledge man is able to see in the present fact its past history; he is able moreover, to see in the present fact its future as a possible fact which he may realize by an act of his will.

Man differs from the animal in this great power of seeing ideals and in reinforcing sense-perception by adding to each thing or fact before his senses the vision of its past and the vision of its future. Man thus becomes comprehending; he explains the fact by its process of evolution, he becomes practical or a will-power through effecting some change or modification in the thing or fact in order to realize his vision of its ideal.

A false psychology tells us that we derive all our knowledge from sense-perception. We see form or shape, and color; feel, taste, smell, or hear, hardness, flavor, odor, and sound; but we do not by any of these learn the idea of causal process. This comes through thinking, and is an original acquisition which thinking mind brings with it. By this idea of causal process all the data of sense are transformed radically. They are given us in sense-perception as independent realities. In thinking them by the aid of causality, we make all these matters of sense-perception into phenomena—or effects and manifestations of underlying causes which are not visible or tangible—not flavors, sounds, nor odors.

No generalization is possible without ascending from the immediate thing or fact to the causal energy. By their common causal energy we unite objects into classes, we unite the various heterogeneous things, such as acorns, oak-leaves, roots, saplings, trees, oak-wood, in one causal process of the oak.

Without the idea of causality we could never distinguish exter-

nal objects from our feelings, and hence, experience never could begin.

Man goes back from the fact to its producing cause. But he goes back of its producing cause to a deeper cause that unites two or more series of producing causes — back of the oak and pine to tree in general; back of tree, and grass, and lichen, to plant in general; back of plant, and animal, to life in general. Man's power of thought rises from thing to cause, and from cause to cause, leaving a smaller and smaller residuum of mere sense-data, and yet getting nearer the underlying reality which causes all these sense-data.

This is the great point for educators to observe. We do not get at the true reality by sense-perception, but by thought. Force is never perceived directly by the senses — a thing is here and a thing is there, but motion is not perceived — only inferred; force is only inferred. Thought puts together this fact and that, this present one and that past one, and unites them by the idea of causality, and the idea of force is born.

So thought produces the idea of space, pure space containing all, infinite in extent, and yet not material, not to be perceived by any of the senses. With the ideas of space and time — ideas that thought generates of itself in order to think the data of sense-perception into a consistent whole — with these ideas of space and time the idea of quantity is evolved and mathematics becomes possible.

In mathematics man beholds not merely a few data of sense-perception, but the universal conditions of all sense-perception. The laws of quantity as formulated in arithmetic, geometry, and the calculus give us the logical conditions of the existence of all matter and all motion, not only all that exists, but all that may or can exist.

Now this must be borne in mind when we make comparison of the educational effect on the mind of a child produced by learning arithmetic and geometry with that produced by learning how to make a box or a joint, or weld two pieces of iron. Grant that all these processes are educative, at least in the first process of their acquirement. To make a box requires special applications of knowledge of a special kind — measurement, adaptation, dividing with the saw, the use of the hammer and nails. It is special, and there is something learned regarding the texture of wood and nails,



some skill or knack acquired in the handling of tools—some pleasurable feeling of self at the consciousness of what one can accomplish by his labor. But in the study of mathematics there is an immeasurably higher feeling of self in the perception of the power of the intellect not merely to know passively, but to know actively, not merely to know the small portion of the universe presented to its immediate senses, but to know the conditions of existence of all matter near and remote, now, in the past, and in all future time. What a glimpse of the dignity and commanding eminence of mind arises through the study of geometry! The three angles of any triangle are equal to two right angles—the pupil need never measure one real triangle to know this. On the basis of the ratios of the sides of the right angled triangle to one another, man proceeds to measure all things inaccessible to manual measurement—he measures the distance of the sun and of the fixed stars. Compare the feeling of selfhood that is gained by the soul in the use of the tools of thought with that gained by any form of manual labor.

In learning arithmetic the boy learns to quantify and measure all things numerically. It is not coördinate with the knowledge of carpentering, but it underlies it; at least, there can be no use of the carpenter's rule without some arithmetic.

But the school studies are for the most part given to a knowledge of human nature and human combination, rather than to a knowledge of material things. This is due to the fact already seen, namely: that man is a social being, and is all that he is as a spiritual being—an educative being—through this fact of organized existence in institutions. All science, all literature, all art, the whole world of learning in fact, takes its rise in man's dependence on society. Society is the miraculous instrumentality by which each individual aids every other and in turn is aided by all. In food, clothing, and shelter, he brings by commerce all productions of all climes to his market, collecting from all and distributing to each.

In matters of human experience it is still better, because the aggregate of human wisdom does not have to be divided in distributing it. Each man may receive it whole if he will only learn the symbols in which it is stored up. If the child will learn how to read and write, he may learn the experience of the race through the countless ages of its existence. He may by scientific books

and periodicals see the world through the senses of myriads of trained specialists devoting whole lives to the inventory of nature. What is immensely more than this, he may think with their brains and assist his feeble powers of observation and reflection by the gigantic aggregate of the mental labor of the race. This is the great meaning of school education: to give to the pupil the use of the means for availing himself of the mental products of the race. Compared with what he receives from the race the productions of the most original of men are a mere speck in a wide field of view. Every one may add something to the aggregate of the world's knowledge, but he must, if he is educated and rises above the brute, receive infinitely more than he gives.

Hence, in comparing the educative effect of learning to read with the educative effect of learning the carpenter's trade, we must consider this difference of scope. The one leads to knowledge of a few tools and a limited sphere of the botany of trees — an empirical, but not scientific knowledge of a few wood textures, a few simple processes of combination into shapes for use or ornament — all of which brings also a limited knowledge of self and of human nature. Its whole educative effect is exhausted in a brief time at the manual training school — for we are told by authorities that manual training for educative purposes must not be carried far enough to produce skill.<sup>1</sup> On the other hand, the education of learning to read, — although it is an efficient process of education while in school, yet it is followed by its greatest educative effects afterwards throughout life. For the person is destined to use this knowledge of reading daily as a key by which to unlock the treasures of all human learning. The school has given him possession of the means of permanent and continuous self-education. It is the difference between a piece of baked bread which nourishes for the day and the seed corn which is the possibility of countless harvests. Education that educates the child in the art of self-education is that which the aggregate experience of mankind has chosen for the school. The course of study involves the mastery of letters or the means of intercommunication with the race, the means too of preserving the harvest of observation and reflection. It moreover involves the use of letters in certain fundamental studies — so as to show the pupil how to master the great

<sup>1</sup> See Professor Woodward's excellent remarks on the educative limits of manual training, in his book.



general classes of books. It initiates him into the use of mathematical books, showing him how to understand them by persistent attention and thought — showing him that memorizing the words of the arithmetic does not master the book, but that it is necessary to think out for one's self every statement and see the necessity of it. The mathematical province of letters reveals to the child the realm of man's victory over nature, because having invented mathematics it is only a question of detail — "divide and conquer" — to subdue all nature.

Then comes geography, lifting a curtain and showing the child his race divided into peoples and nations round the globe, all working at something that he himself needs, and the spectacle of the world-commerce bringing to him over all seas the desired articles.

Then there is history, lifting another curtain and showing the doings of man in the past. Man reveals human nature by his actions. Each one reveals to himself a small fragment of human nature, but he does not know much of human nature till he looks into history; for history reveals the higher self of man as organized in institutions. For the first time man comes to know his substantial self when he comes to study history. His little self beholds his colossal self.

Then there is literature, which shows in its prose and poetry the collisions which individuals have made with institutions — Macbeth and Othello, Paris and Helen, Œdipus and Faust. It completes for us the revelation of human nature and more than all other studies is humanizing and civilizing. The school initiates the child into this realm through the intense bursts of impassioned prose and poetry that the school readers contain, showing in these all the varieties of style to be mastered and how to master them; how to ascend from the mere colloquial vocabulary which the child brings with him from the family to the literary styles adequate to express deep thought or fine shades of emotion.

The school also makes a study of language in itself — it teaches grammar, the most difficult of all school studies and the most educative of subtle powers of thought.

But, it is objected to me here: Does not nature give us the material of thought, and language only the symbols of thought? Is not language an arbitrary symbol and nature the eternal reality? I remember saying this once myself when I was a youth in college, and the thought so oppressed my mind that I did not have

patience to remain and graduate, but I left college midway in the course.

Afterwards, when I came to clear up my thoughts, I began to see that I lived in two worlds — the world of nature and the world of man. Moreover, the world of man was much more complex than that of nature, and, strange as it then seemed, the world of man was really much closer to me than the world of nature. It enwrapped me, so to speak, like a garment — a clothing for the mind. Think of nature with its two kingdoms, the organic and inorganic, and the human world with its three provinces — the realization of (1) the will; (2) of the intellect; (3) of the creative imagination. For example, there is the province of institutions with laws, and customs, and usages, national forms of government, religious systems, moral codes, political methods, etc., as the embodiment of human will, revealing the nature of human will just as the habits of ants and bees reveal ant and bee nature. If things and realities are the material of thought, what material of thought is so important for our examination as human institutional growth. Is it a product of arbitrary will? It is at least as much a reality as the habits and actions of animals and plants in which the botanist and zoologist discovers the nature of animals and plants. More than this, these laws and customs are the most dread reality that we know of. It is a matter of life and death to ignore the laws of the state — it is a matter of wasting all one's strength uselessly to disobey the behests of custom however slight. What is so close to man as his wrappage of customs and usages? This is his bond of union with his fellow men.

If it is admitted that these products of man's will are realities and material for thought, think of their vast complexity and extent. But the products of man's intellect are the multifarious sciences and fragments of science, all his philosophic theories and all his inventions in the arts. Within this division there is the province of language — a vast complex system with a structure all its own, and yet revealing the structure of thought itself just as forms, and usages, and laws reveal the nature of the human will. And is not language a reality — is it not the material vehicle of thought, and does it not exist as an object for thought and scientific consideration? In its language lies embalmed the deepest peculiarity or idiosyncrasy of a people's growth. It is worth while to study a steam engine — an arbitrary product of man's



inventive mind. Because the steam engine is the instrument for the annihilation of distance and separation. It renders intercommunication easy and cheap. It assists in producing civilization by bringing about spiritual communion. But infinitely more important to study is the structure of language, because it is the invention of the soul as a direct and adequate means of expressing its internal acts and states — its thoughts, volitions, and feelings. By language, social union and civilization are realized. To study the grammar and vocabulary of a language is to gain an insight into the structure of soul itself and at the same time to gauge the spiritual development of the people who spoke it. Even the smattering of grammar taught in schools has the great educative effect of turning the mind of the pupil inward so far as to seize definitions and classify words by the meaning that they have. It is a study of the effect which form has upon the meaning of words. Moreover, a training in grammar gives one the power to some extent of discriminating the accidental from the substantial — a training which fits the mind to enter successfully other fields of subtle thought.

The province of literature and art furnishes wonderful material of thought — for it furnishes the symbol of human ideals and aspirations, the grand impulses that move at the bottom of our civilization.

It has been claimed by some of its advocates that we have in manual training an executive action of the mind while we have only a receptive activity in the other school studies.

There is a distinction in psychology between efferent and afferent nerves — nerves that convey outward impulses from the brain to the muscles, and nerves that convey impulses from the surface inward to the brain and give rise to feeling. These are named also motor nerves, and nerves of sensation — or centrifugal and centripetal nerves. This distinction between executive and receptive activities seems to be based on this difference of nerves. It would be assumed in the first place that the most essential forms of human activity are sensor and motor. The individual should be receptive of impressions from without through his nerves of sensation or else he should be executive through using his muscles. Moreover, in order to make this theory apply to manual training it must be held that manual training covers the ground of the motor, or executive. The use of the tools for wood working

and metal working — such use of a portion of these tools as the manual training school furnishes is in fact supposed to be an executive training in an eminent degree. But all the metal workers in the country, according to our last census, amounted to only 585,493 (counting the twenty-two important trades), out of a total number of 17,392,099 returned as engaged in gainful occupations. This is less than three and one-half per cent. of the laboring population, and yet the annual product even of this small fraction of our people exceeds the home consumption of metallic goods. The workers in wood, counting twenty-five trades, numbered only 763,814 out of the seventeen and one-half millions of laborers — about four and one-half per cent. But it is claimed that skill in the use of the tools of these trades would be valuable to all, no matter what their employments might be. This, however, is a position that cannot be maintained, for the following reasons: Every trade has its special knack or skill, and not only requires special education to fit the laborer to pursue it, but it reacts on the laborer and fixes in his bodily structure certain limitations which to a greater or less extent unfit him for other occupations. Even within the trades devoted to the transformation of metals it is found that a long apprenticeship to blacksmithing unfits one for fine work on jewelry, or for engraving. Too much work at planing and sawing, moreover, would injure the skill of the wood carver. Out of the ninety-two per cent. of laborers not engaged in any form of wood or metal work, nearly five per cent. are engaged in the manufacture of textile fabrics or clothing. Counting together those who have to do with these manufactures and with the care of clothing, and with leather manufactures, there are seven per cent. in all whose occupations would be more or less injured by an apprenticeship in blacksmithing and carpentry. For a certain delicacy of touch is required in the manipulation of textile material, that can be acquired only by long continued and one-sided training. Trade and transportation employ eleven per cent. of the laborers; agriculture forty-five per cent. Manual training, if it includes only wood and metal work, fits only eight per cent. for their vocation, and more or less unfits for their vocations a large part of the remaining ninety-two per cent. of laborers.

But the psychology on which this distinction of executive and receptive activities is based is not sound. It omits the



elaborative faculties of the mind altogether. The nerves of sensation may bring in impressions and the nerves of motion may carry impulses outward, but what connects these two activities? Physiological psychology informs us that the brain and the great ganglia at the base of the brain are used by the soul in receiving, coördinating, and comparing these impressions—in short, in thinking upon the data furnished. Moreover, before a decision is reached there must be internal impulses consulted, such as proceed from desires and wishes, and then a comparison of ideals, for one does not act in order to make a thing into what it is, because it is that already. He acts in order to change some real condition into some other condition that exists only in his mind as an ideal possibility. The purpose or ideal being fixed, and the means of realizing it being chosen, the will acts and the motor nerves are called into use to set the limbs in motion or to utter words of command. That the ordinary branches of instruction in school relate to this function of elaboration of data into plans of action far more than they relate to the mere reception of sense-impressions or to the exercise of the motor nerves, is obvious. It is obvious, moreover, that in the perfection of this function of elaboration lies the culture of true directive power. The general who plans the battle and directs the movement of his troops so that they secure victory is of course the executive man in a far higher sense than the private soldier who mechanically obeys what he is ordered to do. The general may use his motor nerves only in issuing the words of command, while the private soldier may exert to the utmost every muscle in his body—yet the real executive is the general.

It is not desirable that children shall be taught that rough hand labor is in itself as honorable as the elaborative toil of thought which gives rational direction to the hand. The best function of the manual training school is its training of the elaborative faculties of the mind—its studies on the rationale of the construction and use of tools—its study of mathematics and science. This points out the road of permanent usefulness for such schools. They may fit master workmen for the several trades and occupations and thereby furnish overseers who not only can direct but can teach besides.<sup>1</sup>

<sup>1</sup> It is sometimes claimed that the educative effect of the manual training school is the remedy for a prevailing distaste for manual labor. Professor Woodward phrases it

It is evident that the elaborative function of the mind is the true source of executive power. The problems of life must be solved by thought before they can be reduced to action without waste of energy.

There is one phase of the psychology of manual training which deserves special commentary. *Æsthetic* training through drawing properly taught gives an educative effect of a far-reaching character as respects all of our industries. In it is also contained the solution of the economic problems that lie deep down under the manual training questions here considered.

By proper instruction in drawing one must mean the cultivation of the hand and eye by the use of the pencil — but this is only the first and least important part — it is more manual and less mental than the second requisite which is an instruction in the ideals of tasteful and decorative form which should be taught in parallel lessons in connection with the practical use of the pencil.

Once trained to recognize the beautiful and graceful in form and arrangement and to criticise all defects in this particular, the pupil has acquired a precious quality of mind useful in every occupation and in every station in life, whether subaltern or directive. Culture in taste, such as drawing gives, fits all laborers for more lucrative stations and helps our industries by giving our commerce a firm hold on the markets of the world. Not merely wood and metal work profits by this cultivation in taste, but all manufactures, whether of food, clothing, or shelter.

The educative effect of art is also ennobling, for it leads to the preference of an ideal which is not a selfish one.

"the overcoming a most humiliating repugnance on the part of so-called educated people to using their hands." To this it may be said, that if it is the object of the manual training school to cure dudes of their contempt for honest labor, it should first get some compulsory system of attendance for that class of the community. Professor Woodward declares that "The manual training school is not an asylum for the lazy." Indeed, his entrance examinations carefully sift out all boys who do not give evidence of past industry and good habits — in short, all boys who are not already in love with honest hand work. If the object of the school is to fit ordinary boys for the trades and cure them of aspiration for clerkships and professional work, the statistics show an alarming influence in another direction. In the Chicago Manual Training school, out of the eighty-seven graduates in the three years, 1886, '87, '88, there were fifty-one at least who are reported as looking higher than manual labor, namely: four teachers, twenty-eight students in higher institutions, seven entering the professional work of architect or engineer, and twelve clerks, while only twenty-five appear to be engaged in manual work, either as overseers or workmen. Of the one hundred graduates of the St. Louis Manual Training school in the years 1883, '84, and '85, it appears that sixty-five look above manual labor (six teachers, twenty-nine students in higher institutions, twenty-one clerks, nine professionals), while only twenty-five are reported as engaged in work of farming and mechanical pursuits as laborers or overseers.



If we could see in the Slöjd training a more prominent place offered to art studies,<sup>1</sup> we could predict with some certainty the rise of Sweden from the low rank she holds among manufacturing nations. Instead of furnishing raw material to other nations — she sends us pig and scrap iron, and rags<sup>2</sup> — she would begin to send out finished goods, as Belgium and France have sent out for a long time, and as England has sent out since the foundation of the South Kensington Museum.

However this may be, it is pleasant to record the fact that American manual training schools give far more attention to the study of drawing, although perhaps not enough to the analysis and discussion of the forms of ornament and free design, or in other words to the theory of art.

Whether manual training schools shall develop into industrial schools for the training of apprentices to the several trades, or, on the other hand become incorporated into the school system as a general discipline, depends of course, upon the answer which Educational Psychology finally gives to the question.

<sup>1</sup> In the Slöjd work it is stated that the chief tool used is the jack-knife, though it is the object of the training schools of Sweden to secure skill in the use of other tools. The political economist cannot commend the encouragement of home manufacture of knick-knacks, though he may admit that it is better than sheer idleness during the winter months. Far better would be the introduction of manufactures requiring skilled and combined labor that would draw the peasants into villages, as our own manufacturing establishments have done. To some extent work can be given out by the large manufacturers to the families of the rural population, as for example, as is done here with the manufacture of clothing,—and such work is found far more profitable than knick-knacks, especially when the latter are not made of graceful patterns, or from tasteful designs.

<sup>2</sup> In the official report of Commerce and Navigation of the United States for 1881, the imports from Sweden and Norway are reported as pig iron, \$111,176; bar iron, \$517,959; old and scrap iron, \$114,883. Total, \$744,018. But of manufactures of iron and steel, only \$11,749 are reported. It is surprising to note that we imported wood manufactures from them only to the small amount of \$137, while we imported rags for paper manufacture to the amount of \$39,090, but no manufactured clothing to speak of! The same year Belgium sent us wood manufactures to the value of \$118,146, or nearly one thousand times the value of the same item from Sweden and Norway! (See pp. 43, 59, 60, 63, 78, 79.)





